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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/634,424	08/05/2003	Mohammad M. Samii	200205843-6	7791

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HEWLETT-PACKARD COMPANY  
Intellectual Property Administration  
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EXAMINER

NGUYEN, LAM S

ART UNIT	PAPER NUMBER
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2853

DATE MAILED: 05/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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<b>Office Action Summary</b>	<b>Application No.</b> 10/634,424	<b>Applicant(s)</b> SAMII, MOHAMMAD M.	
	<b>Examiner</b> LAM S. NGUYEN	<b>Art Unit</b> 2853	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 07 February 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-14 and 23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-14 and 23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☒ Certified copies of the priority documents have been received in Application No. 10/165,266.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Terminal Disclaimer*

The terminal disclaimer filed on 02/07/2005 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of the US patent No. 6799819 has been reviewed and is accepted. The terminal disclaimer has been recorded.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1-4, 9, 13, 14, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tamura et al. (US 4794463) in view of Werking (US 4270046).

Tamura et al. discloses a printhead assembly (*FIG. 1*) comprising:

a plurality of ejection elements (*FIG. 2, element 19a or 19b*), each of the ejection elements configured to cause fluid to be ejected when the ejection element is activated, and

a plurality of photosensors (*FIG. 2, element 15: Photoconductive*), each photosensor coupled to one of the ejection elements (*FIG. 2, element 19a or 19b*), each photosensor configured to generate an activation signal that causes the ejection element coupled to the photosensor to be activated when the photosensor is illuminated by a light source (*FIG. 2:*

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*When the photoconductive 15 is illuminated by the light source 5, a signal is generated in element 19b through element 14a).*

Tamura et al. does not disclose wherein the photosensors are in junction type such as photodiodes or phototransistors and further comprising a plurality of amplifiers, each photosensor being coupled to one of the ejection elements via one of the amplifiers (**Referring to claims 1-4**).

Werking discloses a two terminal optical sensor in which a light sensor is a photodiode or phototransistor (*column 3, lines 43-47*) rather than a photoconductive to reduce the effect of the temperature on the device and allow for a possible increase in breakdown voltage (*column 3, lines 55-60*). Moreover, the optical sensor includes an amplifier for amplifying the signal generated by the photodiode or phototransistor to drive a load (*Abstract and FIG. 1-2, FIG. 5*).

Therefore, it would have been obvious for one having ordinary skill in the art at the time invention was made to modify the printhead disclosed by Tamura et al. to replace the photoconductive by the photodiode or phototransistor and include the amplifier for amplifying the output signal from the photodiode or phototransistor as disclosed by Werking. The motivation for doing such replacement would reduce the effect of the temperature on the device and allow for a possible increase in breakdown voltage and the including of the amplifier would allow for the use of a smaller photodiode having less capacitance as taught by Werking (*column 3, lines 47-60*).

**Tamura et al. also discloses the following claimed invention:**

**Referring to claim 9:** wherein the plurality of printhead fluid ejection elements are formed on a glass substrate (*column 19, line 64 to column 20, line 13*).

**Referring to claim 13:** wherein the printhead assembly is a page-wide-array printhead assembly (*FIG. 1, 9*).

**Referring to claim 14:** wherein each photosensor coupled to one of the ejection elements is positioned substantially adjacent to the ejection element that it is coupled to (*FIG. 1-2*).

2. Claims 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tamura et al. (US 4794463) in view of Werking (US 4270046), as applied to claim 1, and further in view of Sueoka et al. (US 6024439).

Tamura et al. discloses the claimed invention as discussed above except wherein the ejection elements are thermal or piezoelectric inkjet elements and wherein the plurality of ejection elements are organized into four page-wide-arrays of ejection elements.

Sueoka et al. discloses a printing apparatus having four page-wide-arrays of ejection elements for ejecting four different colors of inks (*FIG. 10, element 10B, 10C, 10Y, 10M*).

Sueoka et al. also suggests that the ejection element should be a thermal or piezoelectric inkjet element to obtain high response characteristics to a printing signal and be ease of making to an ink jet head having much more ejecting openings (*column 1, lines 20-30 and column 9, lines 10-15*).

Therefore, it would have been obvious for one having ordinary skill in the art at the time invention was made to modify the printhead disclosed by Tamura et al., as modified, to use thermal inkjet elements for ejecting inks and to organize them into four page-wide-arrays as disclosed by Sueoka et al. The motivation for doing so would have been to be able to print color images, to obtain high response characteristics to a printing signal, and to be ease of making to

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an ink jet head having much more ejecting openings as taught by Sueoka et al. (*column 1, lines 25-30*).

3. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maru et al. (US 5877784) in view of Tamura et al. (US 4794463) and Werking (US 4270046).

Mura et al. discloses a printhead assembly (*FIG. 11*) comprising:

a plurality of ejection elements (*FIG. 11, element 101*), each of the ejection elements configured to cause fluid to be ejected when the ejection element is activated.

Mura et al. also discloses that the image data is transferred on a wiring cable to a shift register (*FIG. 11, element 105*) of the printhead from an external device. However, Mura et al. does not disclose a plurality of photosensors, each photosensor is coupled to one of the ejection elements and configured to generate an activation signal that causes the ejection element coupled to the photosensor to be activated when the photosensor is illuminated by a light source.

Tamura et al. discloses a page-wide printhead receiving image data from an external device by an optical linking, wherein the printhead has a plurality of photosensors (*FIG. 2, element 15*) for receiving optical image data, wherein each photosensor is coupled to one of ejection elements (*FIG. 2, element 19a or 19b*) and configured to generate an activation signal that causes the ejection element coupled to the photosensor to be activated when the photosensor is illuminated by a light source (*FIG. 11, element 5*) (*column 1, lines 55-61*).

Therefore, it would have been obvious for one having ordinary skill in the art at the time invention was made to modify the printing apparatus disclosed by Maru et al. to transfer image data by the optical linking and replace the shift register by an array of plurality of photosensors for receiving optical image data as disclosed by Tamura et al. The motivation for doing so would

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have been to eliminate the wiring connection as a common technique well known in the art to electrically isolate the printhead from the external device.

In addition, Maru et al. and Tamura et al. do not disclose wherein the photosensors are in junction type such as photodiodes or phototransistors (**Referring to claims 1-3**).

Werking discloses a two terminal optical sensor in which a light sensor is a photodiode or phototransistor (*column 3, lines 43-47*) rather than a photoconductive to reduce the effect of the temperature on the device and allow for a possible increase in breakdown voltage (*column 3, lines 55-60*).

Therefore, it would have been obvious for one having ordinary skill in the art at the time invention was made to modify the printhead disclosed by Maru et al. and Tamura et al. to replace the photoconductive by the photodiode or phototransistor as disclosed by Werking. The motivation for doing such replacement would reduce the effect of the temperature on the device and allow for a possible increase in breakdown voltage as taught by Werking (*column 3, lines 47-60*).

**Mura et al. also discloses the following claimed invention:**

**Referring to claim 4:** a plurality of amplifiers (*FIG. 11, element 102-104*), wherein the image data is fed to one of the ejection elements via one of the amplifier.

4. Claims 5-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maru et al. (US 5877784) in view of Tamura et al. (US 4794463) and Werking (US 4270046), as applied to claims 1 and 4, and further in view of Millman et al. (Microelectronics, Second Edition, McGraw-Hill, Inc, 1987).

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Maru et al., as modified, discloses the claimed invention as discussed above and also disclose wherein each amplifier comprises first and second bipolar junction transistors (BJT) (*FIG. 11, element 102*), a latch (*FIG. 11, element 104*) being coupled to the gate/base of the first transistor of the amplifier, and wherein the second transistor of each amplifier is coupled to the first transistor of the amplifier and to one of the ejection elements (*FIG. 11, element 101*), the second transistor of each amplifier configured to provide a drive signal for activating the ejection element coupled to the second transistor when the first transistor of the amplifier is turned on (*FIG. 11*).

However, Maru et al., as modified, does not disclose wherein the transistors are field effect transistors (FET), each including a gate, a source, and a drain.

Millman et al. teaches that an important feature of field-effect transistors is that it is often simpler to fabricate and occupies less than space on a chip than does a BJT in order to increase component density in a very large scale integration (*page 133, second paragraph*). Moreover, the field-effect transistor includes a gate, a source, and a drain (*page 135, fourth paragraph and FIG. 4-3*).

Therefore, it would have been obvious for one having ordinary skill in the art at the time invention was made to modify the amplifier disclosed by Mura et al., as modified, to use the field-effect transistors rather than bipolar junction transistors (BJT) as disclosed by Millman et al. The motivation for doing so because it is simpler to fabricate and occupies less than space on a chip, so it is able to increase component density to build a very large scale integration as taught by Millman et al. (*page 133, second paragraph*).

#### ***Response to Arguments***



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Applicant's arguments with respect to claim 1 have been considered but are moot in view of the new ground(s) of rejection.


***Contact Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LAM S. NGUYEN whose telephone number is (571)272-2151. The examiner can normally be reached on 7:00AM - 3:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, STEPHEN D. MEIER can be reached on (571)272-2149. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

LN  
April 29, 2005

  
HAI PHAM  
PRIMARY EXAMINER